What is claimed is:

1. An electrically conductive layer, comprising:

A. a continuous or discontinuous, non-conductive first phase comprising a polyimide base polymer, and

B. a discontinuous, conductive second phase comprising 80, 85, 90, 95, 96, 97, 98, 99 or 100 weight percent carbon nanotube particles, wherein the weight percent of the second phase, based upon the total weight of both phases, is in a range between any two of the following percentages: 0.10, 0.20, 0.30, 0.40, 0.50, 0.75, 1.0, 2.0, 3.0, 4.0, 5.0, 10.0, 15.0, 20.0, 25.0, 30.0 35.0, 40.0, 45.0, 46, 47, 48, 49, and 50%,

wherein the layer has a thickness between two and 500 microns, and

wherein the layer or a precursor thereto is oriented on a molecular scale in one or more directions to provide a surface electrical resistivity between, and including, any two of the following 50, 75, 100, 250, 500, 750, 1×10^1, 1×10^2, 1×10^3, 1×10^4, 1×10^5, 1×10^6, 1×10^7, 1×10^8, 1×10^9, 1×10^{10}, 1×10^{11}, 1×10^{12}, 1×10^{13}, 1×10^{14}, and 1×10^{15} ohms per square.

2. An electrically conductive layer according to Claim 1, wherein the volume electrical resistivity is in a range between and including any two the following: 50, 75, 100, 250, 500, 750, 1×10^1, 1×10^2, 1×10^3, 1×10^4, 1×10^5, 1×10^6, 1×10^7, 1×10^8, 1×10^9, 1×10^{10}, 1×10^{11}, 1×10^{12}, 1×10^{13}, 1×10^{14}, and 1×10^{15} ohm-centimeters.

3. An electrically conductive layer according to Claim 1, wherein the carbon nanotube particles are present in an amount of from 1 to 100 weight parts per thousand weight parts of the conductive layer.

4. An electrically conductive layer according to Claim 1, wherein the mechanical elongation of the film is in a range between and including any two of the following 30, 40, 50, 60, 70, 75, 80, 85, 90, 95 and 100 percent.

5. An electrically conductive layer according to Claim 1, wherein the layer provides a mechanical elongation of between 50 and 80 percent.

6. An electrically conductive layer according to Claim 1, wherein the thickness of the layer is between eight and 125 microns.

7. A process for making an electrically conductive polyimide film

comprising:

(a) dispersing a carbon nanotube particle into a polar organic solvent to form a slurry;

(b) mixing the slurry with a polyamic acid derived from a reaction of substantially equimolar amounts of at least one dianhydride and at least one diamine in a polar organic solvent to form a mixed polymer;

(c) casting the mixed polymer of step (b) onto a surface;

(d) converting and drawing the cast mixed polymer of step (c) to provide a layer with a solids content of from 95 to 99.99 weight percent and a base polymer that is from 90 to 99.99 percent imidized.

8. The process of Claim 7 wherein the film has a surface resistivity in a range from 50 to 1 x 10^{15} ohms per square.

9. The process of Claim 7 wherein the film has a volume resistivity in a range from 50 to 1 x 10^{15} ohms•cm.

10. The process of Claim 7 wherein the conversion of step (d) comprises a thermal conversion step.

11. The process of Claim 7 wherein the film contains dispersed therein from 0.10 to 10.0 weight percent of carbon nanotube particles.

12. The process of Claim 7 wherein the film contains dispersed therein from two to eight weight percent of carbon nanotube particles.